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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/654,669	09/03/2003	Kirsty Spalding	21882-513 UTIL	5366
35437	7590	06/06/2006	EXAMINER	
MINTZ LEVIN COHN FERRIS GLOVSKY & POPEO 666 THIRD AVENUE NEW YORK, NY 10017				BERTAGNA, ANGELA MARIE
ART UNIT		PAPER NUMBER		
1637				DATE MAILED: 06/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	10/654,669	SPALDING ET AL.
	Examiner Angela Bertagna	Art Unit 1637

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 19 May 2006.  
 2a) This action is FINAL.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 17,21-23,32 and 33 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 17,21-23,32 and 33 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____                                    |

## DETAILED ACTION

### *Remarks*

Claims 17, 21-23, 32, and 33 are pending. Claims 1-16, 18-20, and 24-31 were cancelled in the reply filed May 19, 2006. Claims 32 and 33 are new.

#### ***Claim Rejections - 35 USC § 112 (1<sup>st</sup> paragraph, New matter)***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 17, 21-23, 32, and 33 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter that was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Specifically, claims 17, 22, 32 and 33 recite a “delta 14” value or chart. The specification fully describes delta  $^{14}\text{C}$  values and charts, but not “delta 14” values. If the recited “delta 14” value is the result of a typographical error, correction would obviate this new matter rejection.

#### ***Claim Rejections - 35 USC § 112 (2<sup>nd</sup> paragraph)***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 17, 21-23, 32, and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 17 is indefinite because it recites “a delta 14 value” in steps (b) and (c) of the method. It is unclear whether this is a typographical error and determination of a delta <sup>14</sup>C value is intended or if a different measurement is required.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 17, 21-23, 32 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wild et al. (Radiocarbon, 1998) in view of Hedges et al. (Radiocarbon, 1995).

Wild teaches the use of bomb pulse  $^{14}\text{C}$  calibration charts for archaeological and forensic dating purposes. Wild analyzed soft tissue and bone samples from a mummified marmot and bone collagen, lipids from bone and bone marrow, and hair samples from modern samples (see abstract).

Regarding claim 17, Wild teaches a method of determining the birth date of a biomolecule in an animal, comprising:

(a) Collecting a sample of the biomolecule from an animal and purifying away other carbon-containing molecules (see Methods section – Sample preparation, page 274)

(b) determining a delta  $^{14}\text{C}$  value of the carbon atoms in said biomolecule (see Methods section – AMS measurements, page 275)

(c) comparing the delta  $^{14}\text{C}$  value with a calibration delta  $^{14}\text{C}$  chart to determine a birth date of said biomolecule (see Methods section – Age determination, pages 275-276) with an accuracy of 5 years (see Table 2, in particular, the results for the newborn; see also Table 1, modern samples).

Regarding claim 21, Wild teaches the use of human samples (Table 2).

Regarding claim 22, Wild determined the delta  $^{14}\text{C}$  value using an accelerator mass spectrometer (see Methods section – AMS measurements, page 275).

Regarding claim 23, Wild teaches determination of the animal's age based on the radiocarbon dating results (see Table 1 and the first two paragraphs of the results section where modern samples (cat and marmot) were aged).

Art Unit: 1637

Regarding claims 32 and 33, the calibration delta  $^{14}\text{C}$  chart used by Wild is selected from a calibration delta  $^{14}\text{C}$  chart shown in Figure 1 (see Figure 1 of Wild, page 278, which corresponds to the instant Figure 1B).

Although Wild teaches the use of bone samples, tooth enamel was not used.

Hedges collected tooth enamel samples from archaeological samples and performed radiocarbon dating using AMS (page 285). Hedges further discussed the suitability of tooth enamel for radiocarbon measurements and cited specific advantages and drawbacks to its use. Regarding advantages of using tooth enamel, Hedges taught that enamel could be recovered from samples from which bone collagen was unavailable (Introduction, paragraph 1, p. 285). Hedges also taught that enamel is diagenetically more stable than bone, and therefore, likely to provide a better age estimate (Introduction, paragraph 2, p. 285). Regarding disadvantages of using enamel, Hedges taught that the use of enamel for radiocarbon dating remained “an ambivalent prospect” (page 289), due to the presence of contaminating exogenous (specifically, modern, post-bomb testing) carbonate. However, it is important to note that Hedges tested the suitability of tooth enamel for dating archaeological samples, where the presence of contaminating exogenous (modern) carbon presents a critical problem, compared to modern samples, which are unaffected by this problem.

It would have been *prima facie* obvious to one of ordinary skill in the art at the time of invention to utilize tooth enamel in the radiocarbon dating method of Wild. Hedges expressly

taught that tooth enamel was a useful material for radiocarbon dating, because it was available even when collagen was not (page 285, Introduction paragraph 1). Hedges also taught enamel was diagenetically more stable than bone, and therefore, likely to provide a better age estimate by radiocarbon dating (page 285, Introduction, paragraph 2). The ordinary practitioner of the method of Wild would have recognized that enamel was a useful equivalent, and therefore, would have been motivated to use enamel for the forensic applications, where samples with a more rapid turnover rate (such as hair, lipids, or collagen) were unavailable. Although Hedges taught that the prehistoric enamel samples studied contained a persistent amount of contaminating “modern” carbon that introduced error into the ages obtained (page 288), this drawback would not be applicable to the practitioner of the method of Wild which is directed to dating modern samples using the bomb pulse  $^{14}\text{C}$  calibration data to analyze the samples. In other words, although the teachings of Hedges cautioned against the use of tooth enamel for archaeological samples, modern samples consisting entirely of “modern” carbon, would not have displayed the same inaccuracies, and therefore, the ordinary practitioner would have expected a reasonable level of success in utilizing tooth enamel in the method of Wild. Therefore, the ordinary practitioner of the method of Wild, interested in obtaining an equivalent sample for use in radiocarbon dating, would have been motivated to use tooth enamel as suggested by Hedges, thus resulting in the instantly claimed methods.

*Response to Amendments*

Claim Objections

Claims 1 and 10 were previously objected to for containing informalities. Since these claims have been cancelled in the reply filed May 19, 2006, these objections are moot, and accordingly, are withdrawn.

Applicant's amendments to claim 17 are acceptable, and accordingly, the previously made objection is withdrawn.

*Response to Arguments*

35 U.S.C. 112

Claims 1-30 were previously rejected as indefinite. Since, claims 1-16, 18-20, and 24-30 were cancelled in the reply filed May 19, 2006, the rejections of these claims are moot, and accordingly, are withdrawn.

Applicant's amendment of claim 17 to incorporate the previous missing step has been noted. Accordingly, the previously made rejection has been withdrawn.

Applicant's amendment of claim 23 to correct the lack of antecedent basis for the phrase "said animal" is noted. Accordingly, the previously made rejection is withdrawn.

35 U.S.C. 102

Applicant's arguments, see pages 5-6, filed May 19, 2006, with respect to the rejection of claims 1, 3-6, 11-13, 17-18, 22 and 31 as anticipated by Robertson (J. Radioanalytical and Nuclear Chemistry, 2001) have been fully considered and are persuasive. Claims 1, 3-6, 11-13,

Art Unit: 1637

18 and 31 have been cancelled leaving only claims 17 and 22. Robertson does not teach all of the elements of the amended claim 17 (specifically, Robertson does not teach the use of tooth enamel) or provide reasonable motivation for an obvious rejection. Therefore, the previously made rejection is withdrawn.

Applicant's arguments, see page 6, filed May 19, 2006, with respect to the rejection of claims 1-5, 7-8, 11-13, 17-18, 22-23, and 31 as anticipated by Wild (*Radiocarbon*, 1995) have been fully considered and are persuasive. Claims 1-5, 7-8, 11-13, 18, and 31 have been cancelled leaving only claims 17, 22, and 23. Wild does not teach all of the limitations (specifically, Wild does not teach use of tooth enamel) of the amended claim 17, and therefore, the previously made rejection is withdrawn.

Applicant's arguments, see pages 6-7, filed May 19, 2006, with respect to the rejection of claims 1, 4, 11, 17-18, 22-24, and 31 as anticipated by Kalish (*Marine Biology*, 1997) have been fully considered and are persuasive. Claims 1, 4, 11, 18, 24 and 31 have been cancelled leaving only claims 17, 22, and 23. Kalish does not teach all of the limitations (specifically, Kalish does not teach use of tooth enamel) of the amended claim 17, and therefore, the previously made rejection is withdrawn. Kalish also does not provide sufficient motivation for an obvious rejection, because the otoliths used by Kalish form before teeth during development, and therefore, provide a more accurate estimate of age.

Applicant's arguments, see page 7, filed May 19, 2006, with respect to the rejection of claims 1, 3-5, 7-8, 11, 17-19, and 22 as anticipated by Bonnichsen (*J. of Archaeological Science*, 2001) have been fully considered and are persuasive. Claims 1, 3-5, 7-8, 11, and 18-19 have been cancelled leaving only claims 17 and 22. Bonnichsen does not teach all of the limitations

Art Unit: 1637

(specifically, Bonnichsen does not teach use of tooth enamel) of the amended claim 17, and therefore, the previously made rejection is withdrawn. Bonnichsen also does not provide sufficient motivation for an obvious rejection.

Applicant's arguments, see page 8, filed May 19, 2006, with respect to the rejection of claims 1, 3-5, 11, 17-18, and 20-23 as anticipated by Hedges (*Radiocarbon*, 1995) have been fully considered and are persuasive. Claims 1, 3-5, 11, 18, and 20 have been cancelled leaving only claims 17, 22, and 23. Hedges does not teach all of the limitations (specifically, Hedges does not teach a method with an accuracy of +/- 5 years) of the amended claim 17, and therefore, the previously made rejection is withdrawn.

35 U.S.C. 103

Claims 9, 10, 14-16, and 24-30 were previously rejected under 35 U.S.C. 103. These claims have been cancelled in the reply filed May 19, 2006. These rejections are moot, and therefore, are withdrawn.

***Conclusion***

No claims are currently allowable.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

Art Unit: 1637

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Angela Bertagna whose telephone number is (571) 272-8291. The examiner can normally be reached on M-F 7:30-5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion can be reached on (571) 272-0782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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